

Comparative Evaluation to Assess Most Reliable Parameter for Assessing Anteroposterior Skeletal Jaw Relationship Using Angle ANB, Yen, W and MKG with Visual Clinical Examination

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Abstract:-

➤ Introduction

During diagnosis and treatment planning of skeletal malocclusions proper evaluation of sagittal jaw relationship is an important step which is generally determined by cephalometric analysis. Any cephalometric analysis based on angular or linear measurement has obvious shortcomings and limitation. The most commonly used parameter is ANB angle which may vary since Nasion being unstable with age questions the reliability of ANB Angle as an indicator for apical base discrepancies.

➤ Objective of The Study

The study evaluates the most reliable parameter for assessing anteroposterior skeletal jaw relationship using angular measurements and their correlation with visual clinical examination.

➤ Materials and Methods

Total of 60 Lateral cephalograms in Raichur population, the cephalograms were grouped according to visual clinical examination as follows • Group 1- Class I (n=20) • Group 2- Class II (n=20) • Group 3- Class III (n=20) Lateral cephalograms in each group were traced

and YEN angle, W angle, MKG angle and ANB angle were measured.

➤ Results

The study showed mean and standard deviation of YEN angle was $119 + 6.76$, MKG angle was $51.05 + 4.94$, W angle was $52.28 + 5.54$ and ANB angle was $1.3 + 2.67$.

Keywords:- ANB Angle, W Angle, Yen Angle, MKG Angle Skeletal Jaw.

I. INTRODUCTION

During diagnosis and treatment planning of skeletal malocclusions proper evaluation of sagittal jaw relationship is an important step which is generally determined by cephalometric analysis. Any cephalometric analysis based on angular or linear measurement has obvious shortcomings and limitation. The most commonly used parameter is ANB angle. It was introduced by Reidel in 1952.¹ It may vary since Nasion being unstable with age questions the reliability of ANB Angle as an indicator for apical base discrepancies.² Also, the jaw rotation as a result of growth and orthodontic treatment may affect the values.³⁻⁵ To overcome these existing problems parameters such as Yen Angle, W angle and MKG Angle were introduced for better analysis of sagittal jaw relationship. The

study evaluates the most reliable parameters for assessing anteroposterior skeletal jaw relationship using angular measurements and their correlation with visual clinical examination.

II. MATERIAL AND METHODS

The study was conducted in Department of Orthodontics and Dentofacial Orthopedics, Navodaya Dental College and Hospital, Raichur. Total of 60 pretreatment Lateral Cephalograms were collected. Lateral cephalograms in each group were traced. YEN, W, MKG and ANB angles were measured. SPSS Software was used for statistical analysis. The mean and standard deviations were determined and correlated with visual clinical examination. ANOVA and POST HOC Analysis were done. Correlation between groups was done using Pearsons correlation.

III. RESULTS

The mean of YEN angle among total population is 119.033 ± 6.76 . The mean of MKG angle and ANB angle among total population is 51.05 ± 4.94 and 1.3 ± 2.67 respectively. All three were highest in class II and lowest in class III. The mean of W angle among total population is 52.28 ± 5.54 . it was highest in class III and least in class II (TABLE 1).

The results of post hoc Analysis showed significant results among all the groups except class I - class III and class II - class III in MKG angle as well as class I - class III in W angle (TABLE 2).

In Class I YEN, MKG and W angles showed positive correlation with each other and ANB angle displayed negative correlation with all the other angles. In Class II all the angles showed negative correlation except ANB-MKG. In Class III positive correlation was seen between YEN-W and MKG-ANB (TABLE 3).

IV. DISCUSSION

Facial profile influenced by genetic and environmental factors, which show complex interactions to define the form and function of cranio- facial complex, relationship between facial profile and cephalometric sagittal values are compared in the present study. Cephalometric values used were angle ANB, W, MKG and YEN. Even though ANB angle is most widely used it's not completely reliable as point N changes with age, alters with variation in anterior cranial base. Point A & B in the alveolar bone also changes with tooth inclination and cannot be identified accurately. The growth rotation of

Jaw clockwise and anticlockwise alters ANB angle.⁶The YEN and W angle suggested for anteroposterior jaw relation uses landmarks point M, P, G and S. The 'S' point used as a landmark may vary with age, as it moves upward and backward during growth and development, anatomy of sella tursica may vary due to radiographic technique and radiographic enlargement, thereby altering the position of sella. The G point and M point even though considered stable landmarks may vary due to inappropriate positioning of premaxilla and Symphysis may also result in errors in locating the centre. W angle cannot be used to determine which jaw is retrognathic or prognathic in class II & class III cases. Change in point M due to anticlockwise rotation of maxilla increases the angle, by bringing KR & M point in same line. In such cases Clockwise rotation with prognathic maxilla results decrease in MKG angle misleading it as Class III. Hence MKG angle is not reliable in case of Jaw rotations. Apart from these short comings the study shown significant positive correlation of YEN angle with W angle followed by MKG in Class I. ANB with Class II profile and in Class III with MKG angle followed by W.

V. CONCLUSION

Various angular parameters have been formulated to assess jaw discrepancies in the sagittal plane. To enhance diagnosis and treatment plan, we can use multiple angular measurements which will assist in good diagnosis and a better treatment planning after correlating with clinical findings. Visual Clinical examination has to be considered with outmost importance since all the landmarks and constructed points has shortcoming which may vary among patients.

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Angle	Total Population (60)	Class I (20)	Class Ii (20)	Class Iii (20)	F Value	P Value
YEN	119.033 ± 6.76	116.35 ± 3.43	126 ± 1.52	112.55 ± 2.23	8142.8	<0.001
MKG	51.05 ± 4.94	49.254 ± 2.04	56.6 ± 2.303	46.45 ± 2.76		
W	52.28 ± 5.54	53.25 ± 2.42	46 ± 1.21	57.1 ± 3.09		
ANB	1.3 ± 2.67	$1.9 \pm .64$	$4.5 \pm .827$	-2.5 ± 1.39		

Table 1 Mean and Standard Deviations

Table 2 Post Hoc Analysis

YEN	CLASS I	--	<0.001	<0.001
	CLASS II	<0.001	--	<0.001
	CLASS III	<0.001	<0.001	--
MKG	CLASS I	--	<0.001	1
	CLASS II	<0.001	--	.52
	CLASS III	1	.52	--
W	CLASS I	--	<0.001	.61
	CLASS II	<0.001	--	<0.001
	CLASS III	.61	<0.001	--
ANB	CLASS I	--	<0.05	<0.001
	CLASS II	<0.05	--	<0.001
	CLASS III	<0.001	<0.001	--

Table 3 Pearson's Correlation Test

		YEN		MKG		W		ANB	
		Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.
CLASS I	YEN	--	--	.450	<0.05	.677	.001	-.270	.250
	MKG	.450	<0.05	--	--	.410	.072	-.541	<0.05
	W	.677	.001	.410	.072	--	--	-.423	.063
	ANB	-.270	.250	-.541	<0.05	-.423	.063	--	--
CLASS II	YEN	--	--	-.384	.094	-.097	.684	-.669	.001
	MKG	-.384	.094	-	--	-.282	.228	.249	.291
	W	-.097	.684	-.282	.228	--	--	-.052	.826
	ANB	-.669	.001	.249	.291	-.052	.826	--	--
CLASS III	YEN	--	--	-.601	<0.05	.514	<0.05	-.322	.166
	MKG	-.601	<0.05	--	--	-.769	.000	.512	<0.05
	W	.514	<0.05	-.769	.000	--	--	-.439	.053
	ANB	-.322	.166	.512	<0.05	-.439	.053	--	--